COMPARATIVE ANALYSIS BETWEEN THE DESTRUCTIVE BENDING MOMENTS OF END AND T-SHAPE CORNER JOINTS OF FRAME STRUCTURAL ELEMENTS MADE OF SOLID CHESTNUT WOOD WITH A CROSS SECTION OF 50 X 25 mm

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ABSTRACT
A comparative analysis between the destructive bending moments of end and T-shape corner joints of details from solid chestnut wood with cross section of 50 x 25 mm has been done.
It has been found that:
a) The types of joints and the area of their contact surface have considerably influence on their strength characteristics.
b) The T-shape corner joints have in average about 20 % higher destructive bending moment compare to the end corner joints.
c) The non-dismountable mortise and tenon joints are destroyed by average of 80 % higher bending moment compare to the dismountable joints.
d) Dowel joints have 2 times lower bending moment compare to the mortise and tenon joints and from 3 to 24 % higher bending moment compare to the dismountable joints.

Key words: End and T-shape corner joints of frame structural elements; Destructive bending moments of corner joints; Sweet chestnut solid wood.
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Figure 1. End corner joints of components made of solid chestnut wood: 1 – open mortise and tenon; 2 – half open mortise and tenon; 3 – haunched mortise and tenon; 4 – stub blind mortise and tenon; 5 – with two dowels 10 mm; 6 – biscuit butt joint; 7 – with two screws for wood; 8 – with two one-piece connectors “Confirmat”; 9 – with two connectors with screw and cross dowel.
Figure 2. T-shape corner joints: 1 – stub blind oval mortise and tenon - type A; 2 – oval through mortise with tenon - type A; 3 – stub blind oval mortise and tenon with beveled edges - type B; 4 – with oval through mortise and tenon with beveled edges - type B; 5 – with two dowels 10 mm; 6 – biscuit butt joint; 7 – with two screws for wood with hidden head; 8 – with two one-piece connectors “Confirmat”; 9 – with two connectors with screw and cross dowel.

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Figure 3. Sizes and testing schemes of the test samples: a and b – end corner joints; c and d – T-shape corner joints.
Figure 4. Comparative data on the destructive bending moments of end and T-shape corner joints of components made of solid chestnut wood with a cross section of 50 x 25 mm according to the combination of their serial number in table 1.
CONCLUSION
The comparative analysis of the results from the study on the impact of the type of end and T-shape corner joints of components made of solid chestnut wood with 50 x 25 mm cross section on their strength characteristics under bending pressure give grounds for drawing the following more general conclusions and recommendations:
a/ The type of joint has a significant influence on their strength characteristics.
b/ Gluing wood with modern polyvinyl acetate adhesives provides greater strength for the glued joint than the strength of splitting wood as a result of which under bending load all types of corner joints of components made of solid chestnut wood with 50 x 25 mm cross section get destroyed outside of the gluing area. A necessary condition for that is to make the joints with tightness from 0 to 0.15 mm.
c/ The area of contact surface of the joints of components made of solid chestnut has a tremendous impact on their strength characteristic.

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d/ The destructive bending moment of the T-shape corner joints is by around 20% higher compare to the destructive bending moment of the end corner joints.
e/ The non-dismountable mortise and tenon corner joins of structural elements made of solid chestnut wood have 80% higher bending moment compare to the dismountable corner joints.
f/ The dowels joints have two times lower bending moment compare to the joints with mortise and tenon and from 3 to 24% higher bending moment compare to the dismountable corner joints.
g/ The type of the joint has great impact on the strength characteristics of the dismountable corner joints of structural elements made of solid chestnut wood. The difference between their destructive bending moments varies from 13 to 32%.
h/ The specified values of the destructive bending moments should be taken into consideration for strength design of seating furniture made of solid chestnut wood.
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THANK YOU FOR YOUR ATTENTION

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